Claims

1. A supported inorganic layer comprising contiguous particles of a crystalline molecular sieve, the particles having a mean particle size within the range of from 20 nm to 1 μm.

2. A supported inorganic layer comprising particles of a crystalline molecular sieve, the particles having a mean particle size within the range of from 20 to 200 nm.

3. A process for the manufacture of a layer by deposition on a support from a colloidal suspension obtainable by preparing an aqueous synthesis mixture comprising a source of silica and an organic structure directing agent in a proportion sufficient to effect substantially complete dissolution of the silica source in the mixture at the boiling temperature of the mixture, and crystallization from the synthesis mixture at at most 120°C.

4. A process as claimed in claim 3, wherein after its deposition on the support the supported zeolite layer is activated.

5. A process for the manufacture of a layer comprising a crystalline molecular sieve on a porous support which comprises applying to the support a colloidal suspension of molecular sieve crystals having a mean particle size of at most 100 nm, drying the resulting gel on the support and if desired or required activating the resulting layer.

6. A process for the manufacture of a layer comprising a crystalline molecular sieve on a porous support, which comprises pre-treating the porous support to form at a surface thereof a barrier layer, and applying to the support a reaction mixture comprising a colloidal suspension of molecular sieve crystals, having a mean particle size of at most 100 nm, colloidal silica and optionally an organic structure directing agent, and if desired or required calcining the resulting molecular sieve layer.

Claims (Continued)

7. A process as claimed in claim 6, wherein the barrier is a temporary barrier, and is advantageously water.

8. A process as claimed in claim 6, wherein the barrier is a permanent barrier of smaller pore size than the support.

9. A process as claimed in claim 5, wherein the suspension or the reaction mixture is applied to the support by spin or dip-coating.

10. A process for the manufacture of a layer comprising a crystalline molecular sieve on a porous support, which comprises applying to or forming on the support a layer comprising amorphous silica containing seeds of a zeolite having a mean particle size of at most 100 nm, subjecting the layer to hydrothermal crystallization, and if desired or required activating the crystallized layer.

11. A process for the manufacture of a layer comprising a crystalline molecular sieve on a porous support, which comprises preparing a synthesis mixture comprising a source of silica and an organic structure directing agent in a proportion sufficient to effect substantially complete dissolution of the silica source in the mixture at the boiling temperature of the mixture, immersing the support in the synthesis mixture, crystallizing zeolite from the synthesis mixture onto the support, and if desired or required calcining the crystallized layer.

12. The layer produced by the process of claim 3.

13. A layer as claimed in claim 1, wherein the particle size of the molecular sieve crystals in the layer is within the range of from 20 to 500 nm, advantageously from 20 to 300 nm.

Claims (Continued)

14. A layer as claimed in claim 1, wherein the particle size distribution is such that at least 95% of the particles have a size within ± 33% of the mean, advantageously ± 10% of the mean, and preferably ± 7.5% of the mean.

15. A layer as claimed in claim 1, wherein the layer thickness is within the range of from 0.1 to 20 μm, advantageously 0.1 to 15 μm, advantageously 0.1 to 2 μm.

16. A layer as claimed in claim 1, wherein the layer primarily contains nanopores, i.e., pores between 1 and 10 nm.

17. A layer as claimed in claim 1, wherein the layer primarily contains micropores, i.e., pores between 0.2 and 1 nm.

18. A layer as claimed in claim 1, wherein the layer comprises molecular sieve crystals in a particulate matrix, the pore structure being defined by the interstices between the particles, between the crystals, and between the particles and the crystals, the pore structure advantageously being between 0.2 and 1 nm in size.

19. A layer as claimed in claim 1, wherein the molecular sieve is a zeolite.

20. A layer as claimed in claim 1, wherein the layer is a membrane.

21. A process for the separation of a fluid mixture which comprises contacting the mixture with one face of a layer as claimed in claim 1 under conditions such that at least one component of the mixture has a different steady state permeability through the layer from that of another component and recovering a component or mixture of components from the other face of the layer.

Claims (Continued)

22. A process as claimed in claim 21, wherein the separation is of a feed for a reaction from a feedstock.

23. A process as claimed in claim 21, wherein paraxylene is separated from a mixture of xylenes.

24. A process for catalyzing a chemical reaction which comprises contacting a feedstock with a layer as claimed in claim 1, which is in active catalytic form under catalytic conversion conditions and recovering a composition comprising at least one conversion product.

25. A process for catalyzing a chemical reaction which comprises contacting a feedstock with one face of a layer as claimed in claim 1, that is in the form of a membrane and in active catalytic form, under catalytic conversion conditions, and recovering from an opposite face of the layer at least one conversion product, advantageously in a concentration differing from its equilibrium concentration in the reaction mixture.

26. A process for the manufacture of a supported layer in which one of the layer-forming processes as claimed in claim 3 is carried out two or more times, or in which one of these processes carried out one or more times is followed by another of the processes carried out one or more times.